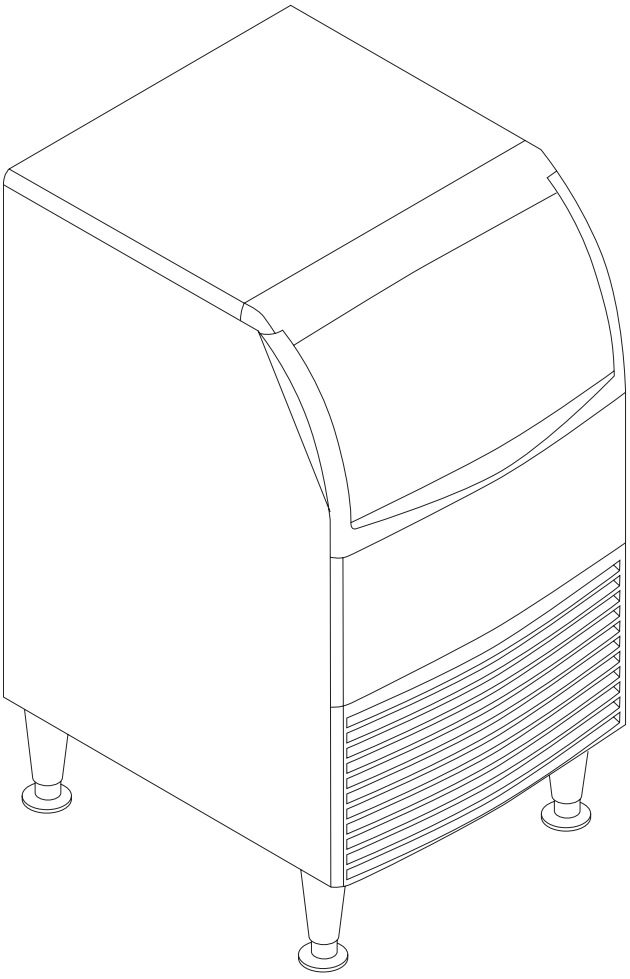
Scotsman®
Ice Systems

Service Manual
for
Cube Ice Machine with storage
models CU0415, CU0715 and CU0920



Introduction

The design of this product is the result of years of experience in developing commercial ice cube machines. It has been designed for simple operation in a wide range of locations. Please follow the instructions for installation and maintenance to get the most use from this ice machine.

Table of Contents

Important Details 2

Pre-Installation. 3

Cabinet Layout, CU0415 and CU0715 4

Cabinet Layout, CU0920 5

Component Location 6

Connect the water supply 7

Connect the power 8

Control Panel and Adjustments 9

Initial Start Up 10

Use and Operational Notes 11

Maintenance 12

Electrical Sequence. 14

Components 15

Performance 16

Thermistor Values 17

Controller Use 18

Anti-Slush 19

Service Diagnosis 21

Service Diagnosis 22

Service Diagnosis 23

Removal and Replacement 24

Removal and Replacement 25

Removal and Replacement 26

Controller 27

Cabinet Removal for Service. 28

115/60/1 Wiring Diagram 29

Observe the Caution and Warning notices. They are indicators of important safety information. Keep this manual for future reference.

Important Details

The machine is designed for use indoors in a controlled environment. It must be kept dry, not overheated or subjected to excessive cold. The water and power supply must be maintained or the machine will stop making ice.

There are limits to how hot or cold the room it's in can be.

- Minimum air temperature: 50°F or 10°C
- Maximum air temperature: 100°F or 38°C.

There are also limits to how hot or cold the water supply can be:

- Minimum water temperature: 40°F or 4.5°C
- Maximum water temperature: 100°F or 38°C.

There are limits to the voltage supply to the unit, voltages vary by model:

Voltage

	115 (-1)
Minimum	104
Maximum	126

Water supply must be potable by the localities definition.

There are limits to the water pressure supplied to the unit:

- Maximum pressure. static: 80 psi or 5.5 bar
- Minimum pressure, dynamic: 15 psi or 1 bar

A drain will be needed for melted ice and rinse water.

Warranty:

The warranty statement for this product is provided separately from this manual. Refer to it for applicable coverage. In general warranty covers defects in material or workmanship. It does not cover maintenance, corrections to installations, or situations when the machine is operated in circumstances that exceed the limitations printed above.

This is a commercial model, if installed in a residence some commercial service companies may not be able to service it on site.

The manufacturer has designed and produced this machine with the finest in materials. The manufacturer assumes no liability for units that have been altered in any way. Alterations or part substitutions will void the warranty. Specifications and designs are subject to change without notice.

Options:

There are two floor mounting kits available:

- KUFM15: for 15" models
- KUFM20: for 20" model

Bottom of Cabinet, showing bumper. Cabinet height includes bumper.

Pre-Installation

This appliance is intended to be used in commercial applications including:

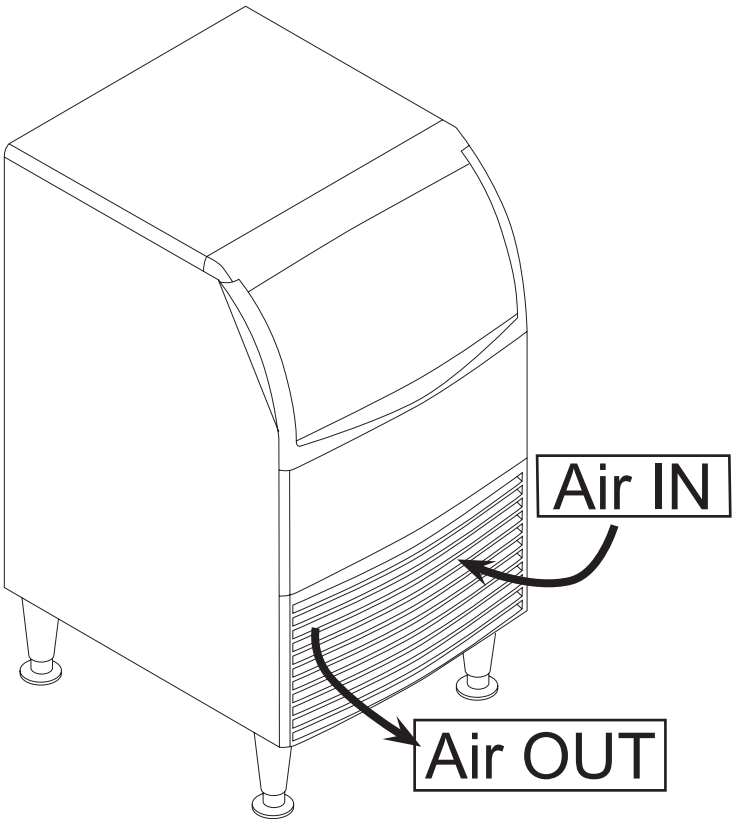
- Restaurant kitchens
- Bars
- Hotels

Dimensions and Electrical:

Model	Electrical (volts/Hz/Phase	Width (in / cm)	Depth (in/cm)	Height (w/o legs) (in/cm)	Total Load Amps
CU0415MA-1A	115/60/1	15 / 38	23.7 / 60.3	31.94 / 81.1	8
CU0715MA-1A	115/60/1	15 / 38	23.7 / 60.3	31.94 / 81.1	8
CU0920MA-1A	115/60/1	20 / 51	23.7 / 60.3	31.94 / 81.1	8

Location:

The unit can be built into a cabinet as the air flow is in and out the front. **The front of the machine must not be blocked.** Certain maintenance or repair procedures will require removal of the top, back and side panels, so plan ahead for service and maintenance needs.



Spacing:

No additional spacing is required at the top or sides. However, suggested minimum side clearance for installation is 1/8 inch or 3 mm and suggested minimum top clearance is 1/4 inch or 7 mm.

Allow 4 inches (100 mm) minimum space at the back for the utility connections. Do not block louvers at the front of the cabinet.

Unpacking and setup

Remove all shipping and packing materials that may be in the ice storage bin.

The unit can be installed with or without legs. The cabinet is equipped with small bumpers on the base to allow placement without legs. An optional floor mounting kit is also available to fill the gap between the machine and floor if not using legs. If using legs, carefully tip the machine and install the legs by screwing them into the leg sockets in the bottom of the machine. For reference, the thread size is 5/8 – 11. If the machine has been tipped onto its side or back allow 1 hour before starting the unit for the oil in the refrigeration system to return to the compressor.

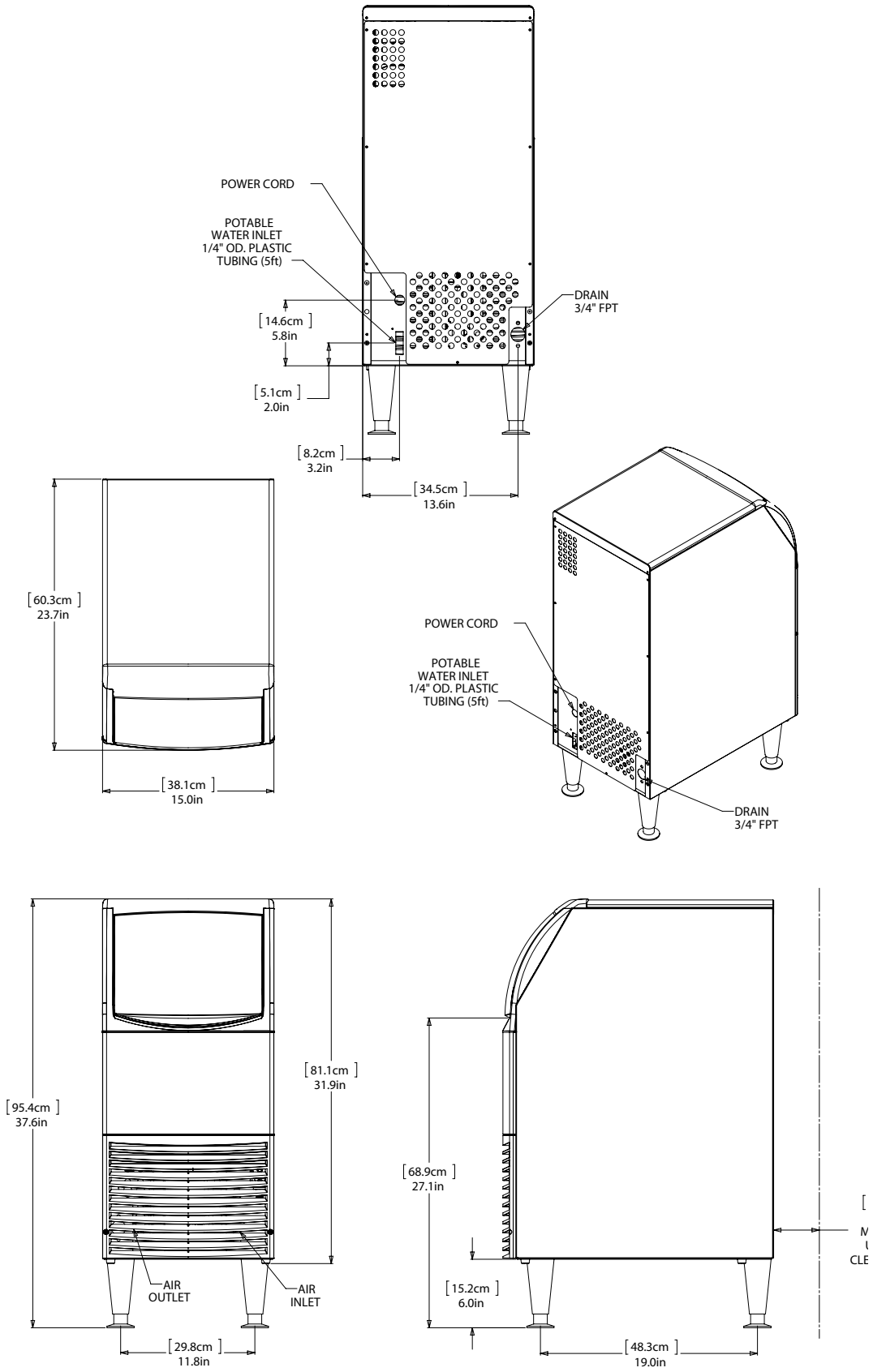
Place the machine in its intended location and level it front to back and left to right. If using legs, adjust their feet in and out to level the cabinet.

If legs are not used the bottom edges of the cabinet must be sealed to the floor.

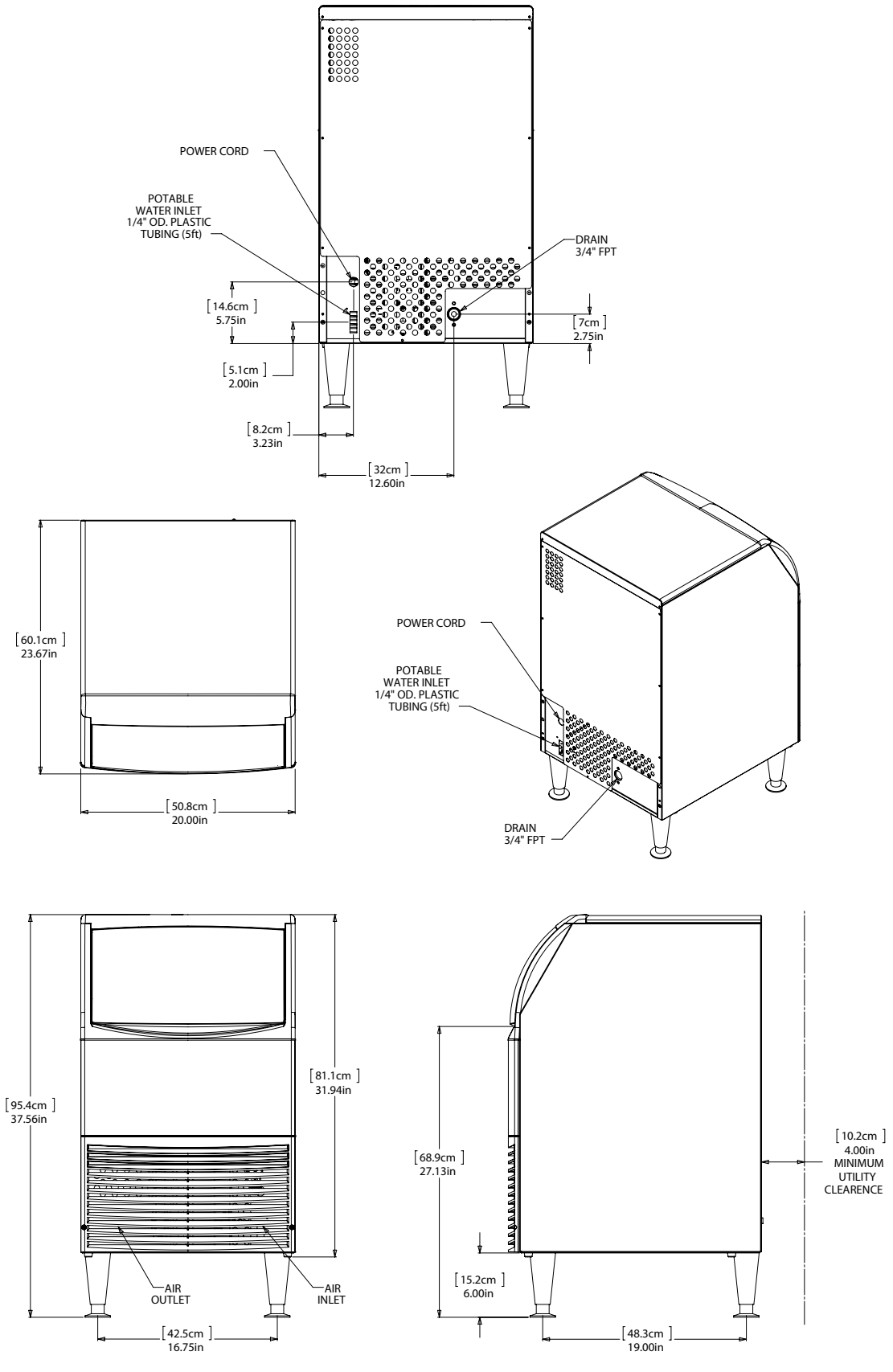
If built into a cabinet, the adjacent cabinet walls will provide the means for containment. There are no means for attachment to the cabinet.

Be sure to remove the plastic covering the exterior panels, if left on it will be much harder to remove later.

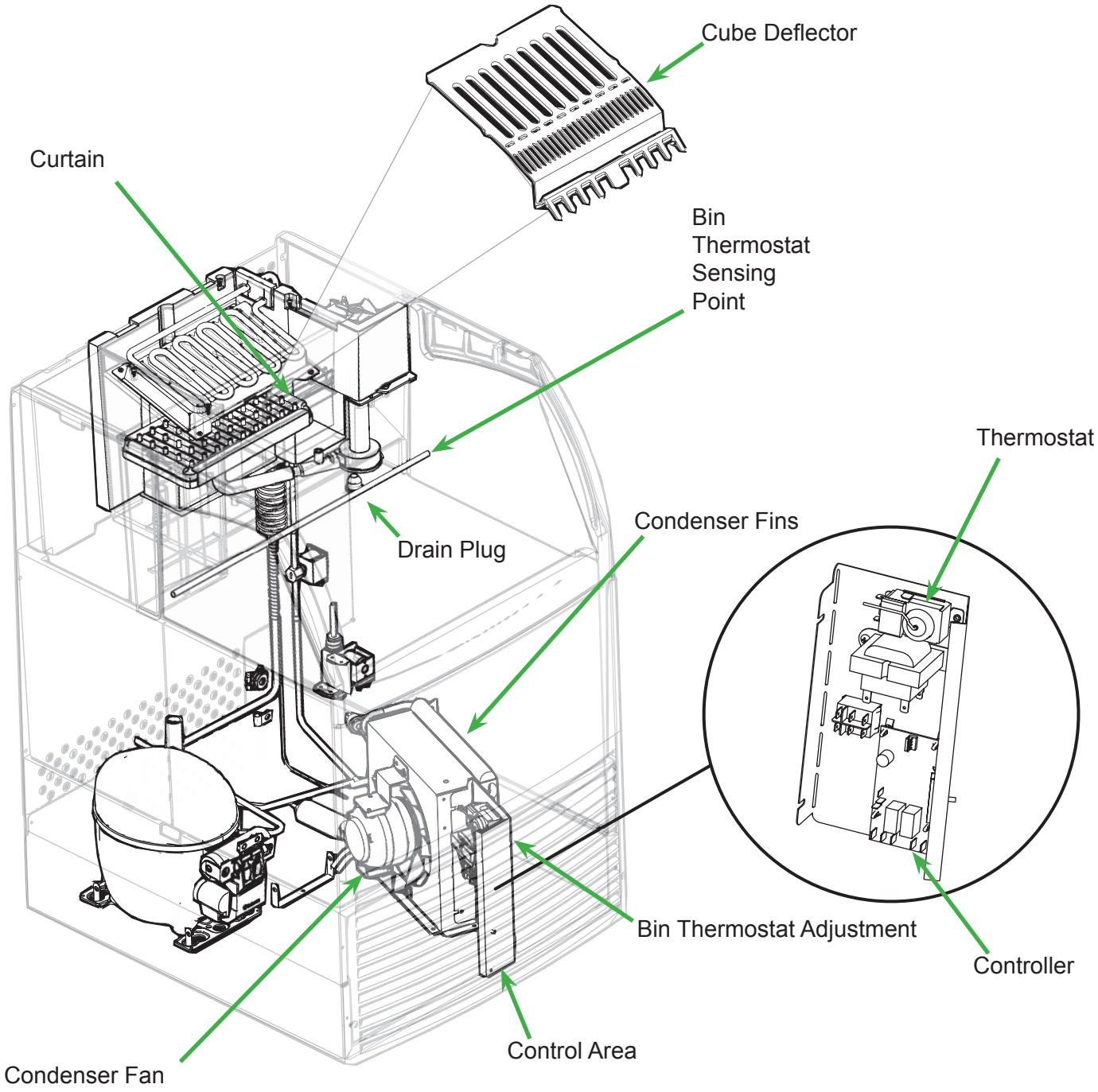
Cabinet Layout, CU0415 and CU0715



Cabinet Layout, CU0920



Component Location



Connect the water supply

Plumbing information:

• The water supply connection is at the back panel. It is a 5' (1.5 meter) 1/4 inch (6.35 mm) OD plastic tube.

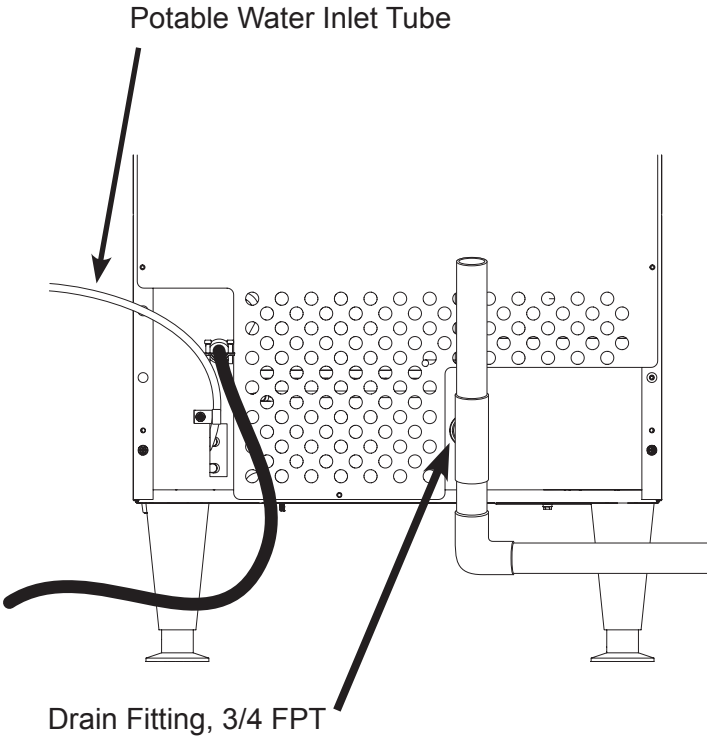
• A hand actuated valve within site of the machine is required to isolate the unit when it's being serviced.

• The machine has a built-in back flow preventer (an air gap between the end of the water inlet hose and the top of the reservoir water), no additional back flow preventer is needed.

• Water flow rate into machine is .25 GPM / .94 LPM.

Units that are built into a cabinet:

Include a loop or coil of tubing between the water supply and the connection on the ice machine. When the machine is pushed back into the cabinet the tubing will coil and not kink.



Connection Information:

WARNING: connect to potable water supply only.

Important: Open the hand water valve to flush water through the connection point before connecting to the ice machine.

1. Cut cable ties securing hose and power cord to unit.
2. Connect to cold, potable water using the necessary adapters for the 1/4 inch OD plastic tube.

• If using compression fittings they require a ferrule or sleeve and insert.

• A female 3/8 compression adapter x 1/4 OD compression allows connection to a typical 3/8 OD compression angle valve.

• Another connection method is by quick connect fittings.

Note: Do not use a piercing-type saddle valve to connect to the building's water supply. Valves of that type restrict water flow and clog easily.

Connect the drain

The drain connection is at the back panel. The fitting size is ¾ FPT.

1. Connect rigid tubing to this fitting and vent it at the machine, use an 8 inch or 200 mm vertical tube for the vent.
2. Slope drain tubing down from the ice machine to the building drain and the slope must be at least ¼ inch per foot or 20 mm per meter.
3. Insulate the drain tubing to reduce condensation and is recommended for environments that have high humidity.

Due to the potential for leaks, condensate pumps are not recommended.

Connect the power

This is a cord-connected unit, and must be connected to its own dedicated power supply. Check the dataplate on the back of the machine to confirm the voltage and per the dataplate use fuses or HACR circuit breakers.

Power Cord:

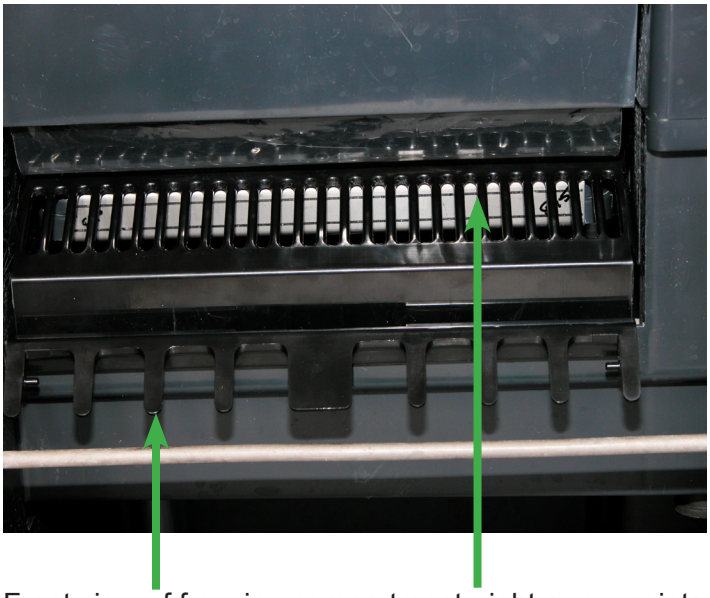
This 115 volt model is equipped with a cord and 5-15P plug.

Follow All Local Codes - This Unit Must Be Grounded. Do not use extension cords and do not disable or by-pass ground prong on electrical plug.

Plug the power cord into the proper power supply.

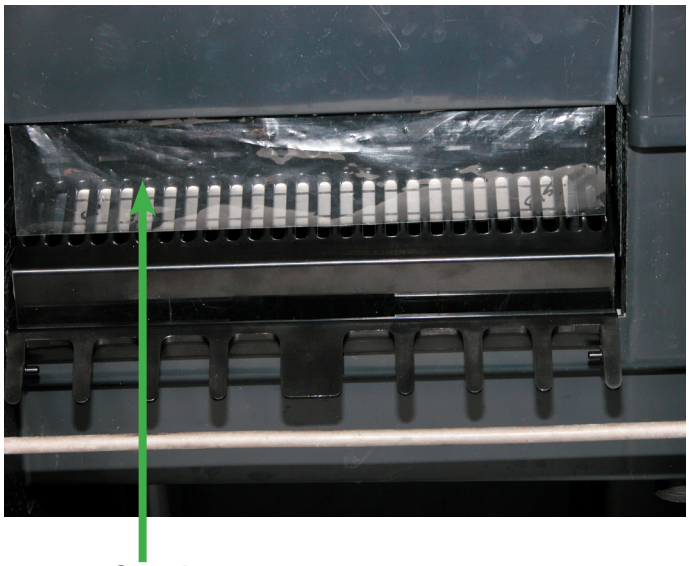
Installation check list

- Has the machine been installed indoors in an environment suitable for it?
- Have all of the shipping items and packaging been removed?
- Has the plastic covering the exterior panels been removed?
- Is the ice chute in the correct position?
- Is the clear plastic curtain hanging down and free to move?
- Has the water supply been connected and confirmed to not leak?
- Has a properly sized and sloped drain tube been attached?
- Has the correct voltage power supply been connected?



Front view of freezing compartment, right arrow points to Spray Platform, under the Cube Deflector. Push curtain back and check that it is in this position.

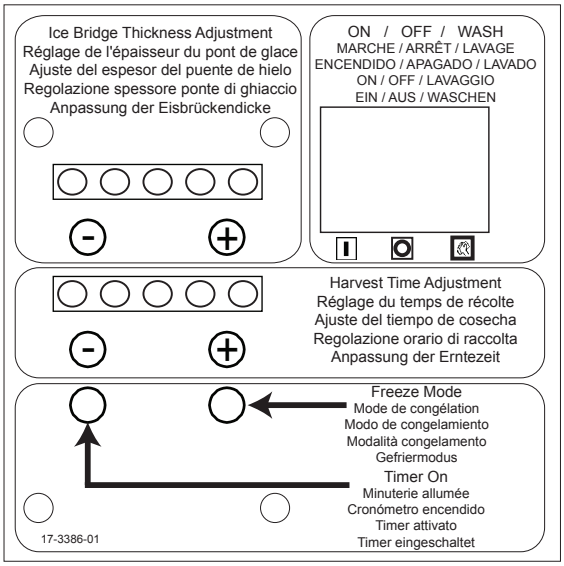
Left arrow points to Cube Deflector, it must be positioned as shown, it snaps onto front edge of reservoir. Remove any packing materials.



Front view of freezing compartment, arrow points to clear plastic curtain. After checking spray platform, pull curtain down to hang freely. This is its normal position.

Control Panel and Adjustments

Ice Bridge Thickness Adjustment Area



Master Switch. Move to ON (left side depressed) to make ice, OFF (centered) to shut off and WASH (right side depressed) for use in cleaning.

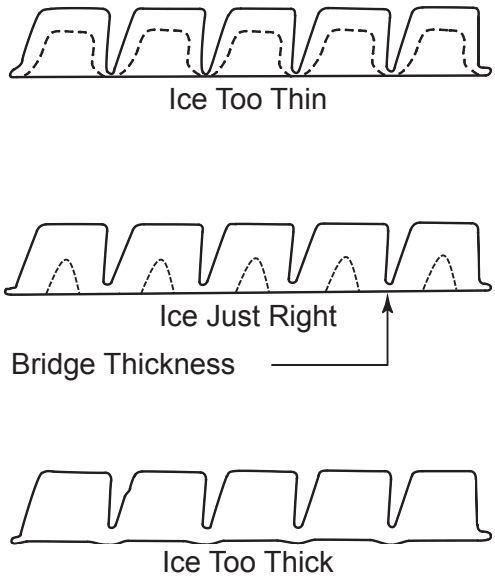
Harvest Time Adjustment Area

Indicator Light Area.

Freeze Mode light is ON when unit is in a Freeze cycle.

Timer On light is ON when trigger point temperature is reached in Freeze or Harvest.

Ice Thickness Diagram



Adjustment Indicator Lights

Each push and release of the + or - button will change the lights that glow or blink indicating a change in ice size or harvest time. Example: pushing + one time changes a blinking light to steady on type. If the lights are on steady a single push of + will add one more light to the right and it will blink. There are 10 settings. All 5 lights on steady is the maximum setting and one blinking light is the minimum.

Ice Bridge Thickness Adjustment

Refer to the Ice Thickness Diagram for proper ice size.

Adjust by pushing the + sign or – sign on the ice bridge adjustment section of the control panel. Changing bridge thickness should be a one-time adjustment as the machine will automatically maintain that ice thickness.

Harvest Cycle Time Adjustment

After ice has formed in the inverted mold, it must be released so it can be deposited in the storage bin section. The harvest cycle is when that occurs, and must be long enough for the ice to release. While the harvest cycle length is self adjusting it can also be manually adjusted if needed.

Proper harvest time is when the ice falls into the bin and there is about 10 seconds extra harvest time (pump and fan are off) before the freeze cycle restarts.

If the harvest time is too short to release the ice, the time may be increased by pushing the + sign on the harvest time adjustment section of the control panel. Operate the machine for another cycle to confirm that the adjustment was correct. Note that too much harvest time will slightly decrease making ice capacity.

Initial Start Up

1. Remove the front panel by removing the two screws holding it to the cabinet and pulling the panel down and off the machine.
2. Turn on the water supply, correct any leaks.

Note: Water supply MUST be turned on first to allow water to enter the machine properly.

3. Locate the On/Off/Wash master switch.
4. Move the switch to the On position.
5. Ice bridge thickness and harvest time indicator lights will switch on. They will not change unless the cube size or harvest times are manually adjusted. The timer light will also be on.
6. The unit begins to fill the reservoir with water. Two streams of water can be seen behind the curtain. The compressor and hot gas valve will be energized, but the fan motor and pump will be off. After a time the water will have filled the reservoir but will continue to fill and excess water will drain from the machine. This is normal and helps the machine from forming excessive mineral scale.
7. After 2 minutes the water and hot gas valves will close and the pump and fan motors will start. A blue light in the control panel will glow indicating the beginning of the freeze cycle.
8. Warm air will begin to blow out the left front of the machine and water will spray up at the inverted ice making mold. It is normal for a small amount of water to drip from the ice making area.

When the water temperature reaches a pre-set point the water pump will stop for about 30 seconds then resume.

Freezing then continues for many minutes until the temperature of the refrigeration system drops to a set point, indicated by a yellow light glowing on the control panel. In colder rooms the fan motor may turn on and off. After the yellow light switches on the freeze cycle continues for seven more minutes. At that time the unit changes to the ice release or harvest cycle. During the ice harvest the hot gas valve and inlet water valve are open, while the pump and fan motors will stop. The blue and yellow lights will go out. Water will refill the reservoir.

9. Within a minute or so the ice formed in the mold will fall down and slide into the ice storage bin. The ice will release as a group so all of the ice formed will fall at once and the next freeze cycle will begin in a few seconds. The timer light may switch on at the end of the harvest cycle.
10. Check the thickness of the ice connecting the cubes to each other, that connection is known as a bridge and it should be about 1/8 inch or 3 to 4 mm thick. It is preset from the factory and should be satisfactory.

Adjustments:

If the ice bridge is too big or too small, the thickness may be adjusted.

Note: The bridge thickness adjustment is used to obtain the CORRECT size, not to adjust to individual preferences. Do NOT make the ice bridge too thick or too thin, as either will reduce ice making capacity. Do NOT attempt to adjust the machine to release individual cubes. There is only ONE correct size.

11. Ice making will continue until the ice level reaches the metal tube in the storage bin, when ice contacts that tube the machine will stop making ice. This can occur in any part of any cycle.
12. Removing ice from the ice storage bin will restart the ice making process.
13. Check for and correct any water leaks from the unit or drain system.
14. Return the front panel to its normal position and secure it to the cabinet with the original screws.

Typical Cycle Times (minutes)

Note: First cycle after any restart will be longer than listed here.

	70/50°F. (21/10°C.)	90/70°F. (32/21°C.)
CU0415	28-30	34-37
CU0715	16-18	23-26
CU0920	14-16	17-19

The time to fill a warm storage bin from empty varies by cabinet temperature and cycle time, but will take about 10-12 hours.

Use and Operational Notes

To use, simply lift the door by its bottom edge and slide it up and into the top of the machine. Use the scoop to remove ice and close the door.

The machine will make the most ice if it has plenty of room to breathe. This is an air cooled product and it must be able to take in room air and discharge air heated by the ice making process. Blockage of vents or exposure to excessive heat will reduce the ice making and storage capacity. The storage bin is insulated but not refrigerated, so ice will melt during use. That is normal and assures that fresh ice is available in the bin.

The fan will make some noise during operation, however rattles and other vibrations are not normal and should be attended to. When the air temperature surrounding the machine is cold, the fan might cycle on and off during the freeze mode.

If the machine is in a space colder than the minimums listed it will not switch on to make ice.

Minor adjustments may be made to compensate for local conditions by rotating the adjustment screw visible above the control area. If in a cold room, CW rotation changes the control to COLDER to fill the bin higher.

If installed at an altitude greater than 2000 ft or 610 meters above sea level, the bin thermostat may need internal adjustment. The adjustment screw is behind the front of the control, accessed through a hole for it.

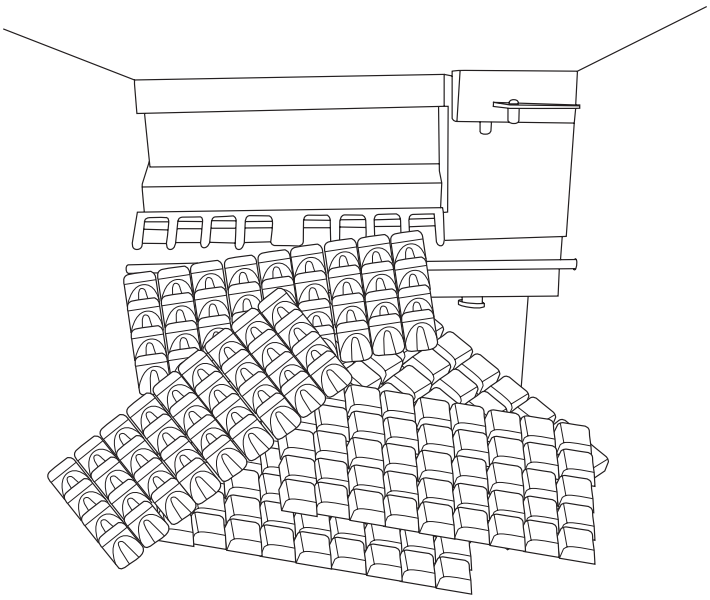
Bin Thermostat Altitude Adjustment Table:

Altitude (ft)	Altitude (meters)	Degree of adjustment
0	0	11 CCW
500	150	none
1000	300	11 CW
2000	600	31 CW
3000	900	52 CW
4000	1200	72 CW
5000	1500	92 CW
6000	1800	111 CW
7000	2100	128 CW

⚠CAUTION	**No Step** Do not stand on the machine. Severe damage can occur.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.



Typical Full Bin

Maintenance

Regularly vacuum the right side of the air cooled condenser with a brush to remove all loose dust and dirt. Be careful not to damage the fins.

Cubed ice machines of this type make ice that is more pure than the water supplied to it. Since the ice has fewer impurities, the water that remains in the reservoir has more. The water system dilutes that concentration but eventually it does build up and need to be removed. Over the years it has been determined that the typical scale removal frequency is about 2 times per year.

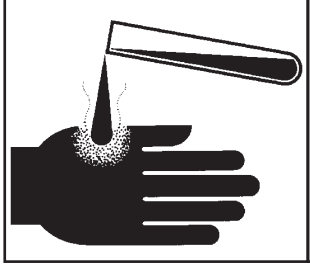
To remove scale from the water system.

Materials needed:

Food grade, nickel safe scale remover for ice machines, also known as ice machine cleaner.

- Sanitizer
- Hand tools.
- Clean bucket
- Clean cloths
- Rubber or plastic gloves

1. Remove front panel.
2. Move master switch to Off, wait a minute and then move it to On.
3. When the freeze cycle begins (blue light on), switch the machine to Off.
4. Remove and discard the ice.
5. Drain reservoir by pulling drain plug and return drain plug to its original position.

⚠CAUTION	Ice machine scale remover contains acids. Acids can cause burns. If concentrated cleaner comes in contact with skin, flush with water. If swallowed, do NOT induce vomiting. Give large amounts of water or milk. Call Physician immediately. Keep out of the reach of children.
	

6. Mix a solution of 5 oz or 150 cc of Scotsman Clear 1 Scale Remover and 2.5 quarts or 2.4 liters of clean, warm (95°F/35°C to 115°F./46°C) water.
7. Pour the solution into the reservoir by carefully adding it at the reservoir's front lip.
8. Move the master switch to the Wash position.
9. Wait 10 minutes.
10. Move the master switch to the Off position.
11. Drain the reservoir by removing drain plug and draining the solution into the bin. Return the drain plug to its normal position.
12. Remove spray platform by removing cube chute and lifting spray platform up and off its connection. If needed open platform and confirm all jets are open. Rinse out any debris, reclose and return it and the cube chute to the unit. Be sure gasket is positioned correctly - narrow side faces up toward jets.
13. Pour 2.5 quarts or 2.4 liters of warm (95°F/35°C to 115°F./46°C) water into the reservoir by adding it at the reservoirs' front lip.
14. Switch the master switch to Wash for 1 minute, then switch it to Off.
15. Repeat step 11. Go to the next process to sanitize the machine.

Sanitize Water System – after completing prior scale removal and stopping at the end of its steps.

1. Mix a 1 gallon or 4 liter solution of locally approved sanitizer and clean, warm (95°F/35°C to 115°F./46°C) water. Use an EPA approved food equipment sanitizer at the solution mix recommended by the sanitizer manufacturer.
2. Pour about half of the sanitizer mix into the reservoir.
3. Remove the cube chute and spray platforms and wash them with the sanitizer, then return them to the ice machine.
4. Move the master switch to the Wash position.
5. Circulate the sanitizer for 2 minutes.
6. Move the master switch to Off.

7. Drain the reservoir into the storage bin by removing the drain plug. Return the drain plug to its normal position.
8. Wash all interior surfaces of the ice machine storage bin, reservoir surface and inside of the door with the remaining sanitizer solution.
9. Pour any excess sanitizer down the ice machine bin drain.
10. Pour 2.5 quarts or 2.4 liters of warm (95°F/35°C to 115°F./46°C) water into the reservoir by adding it at the reservoirs' front lip.
11. Move the master switch to the Wash position for 1 minute, then switch it to Off.
12. Drain the reservoir by removing the drain plug and draining the solution into the bin. Return the drain plug to its normal position.
13. Move switch to the On position. The machine will resume normal ice making.
14. Return the front panel to its original position and secure it with the original screws.

Cleaning the Condenser

1. Remove the front panel.
2. Switch the machine to OFF.
3. Vacuum the surface of the condenser fins, carefully brush off any loose dirt. If grease is imbedded use coil cleaner to wash it out.
4. Switch the machine to ICE.
5. Return the front panel to its original position.

Electrical Sequence

Proper voltage must be supplied and the bin thermostat closed and calling for ice or the control system will not have power.

Initial power up: Moving the master switch from OFF to ON starts the machine in a harvest mode, the compressor is operating with the inlet water solenoid valve and the hot gas valve energized, water enters the machine at the top of the evaporator, flowing down into the reservoir.

After a set time of 2 minutes the inlet water valve shuts off, the hot gas valve closes and the pump, compressor and fan motor start operation. A blue light indicates the freeze cycle mode.

Early in the freeze cycle, when the reservoir water temperature falls enough to cause the resistance of the water temperature thermistor to change to a pre-set point, the controller will shut the water pump off for 30 seconds. When it is shut off a red light on the back of the controller will be ON.

As the freezing cycle continues the suction line temperature will fall, changing the resistance of the thermistor attached to it. At a pre-set resistance a timer in the controller will start to finish the freezing cycle. A yellow light switches on and the freeze cycle will continue for 7 more minutes.

The Harvest or Defrost mode begins. The yellow and blue lights switch off. The pump and fan motor switch off. The hot gas valve and inlet water solenoid valve are switched on. The compressor is on any time the unit is in ice making mode.

Harvest continues until the thermistor attached to the suction line warms up, changing its resistance to a pre-set point. At that time the yellow timer light will switch on. Harvest time equals the minimum harvest time plus the time it takes to change the thermistor's resistance plus a final timer. When all timers are satisfied, harvest is complete and the freeze cycle restarts.

The unit will shut off any time the bin thermostat is open, including while the unit is in a freeze or harvest cycle.

Unit in ice making mode, freeze mode indicator light is on.

Unit in ice making mode, timer indicator light is on.

Components

Compressors, three capacities

Type: Hermetic

Brand: Embraco

Condenser: air cooled forced draft, copper and aluminum.

Evaporator: Nickel plated copper, inverted grid

Ice: Medium / Full Dice cube. 5 x 9 per cycle, about 1 lb per cycle

Metering device: Capillary tube

Refrigerant: R-134a.

Refrigerant Charge: 8 ounces, all models. No access valves.

Fan motor: Unit motor, CU0415 and CU0715 are 2.3 watts; CU0920 is 6 watt. Fan motor may cycle during freeze, should be off during harvest as the discharge pressure will be below 100 PSIG.

Fan blade: Molded

Fan pressure control switch: Opens at 100 PSIG, closes at 150 PSIG.

Water pump: OEM

Hot gas valve: Ported, line voltage coil

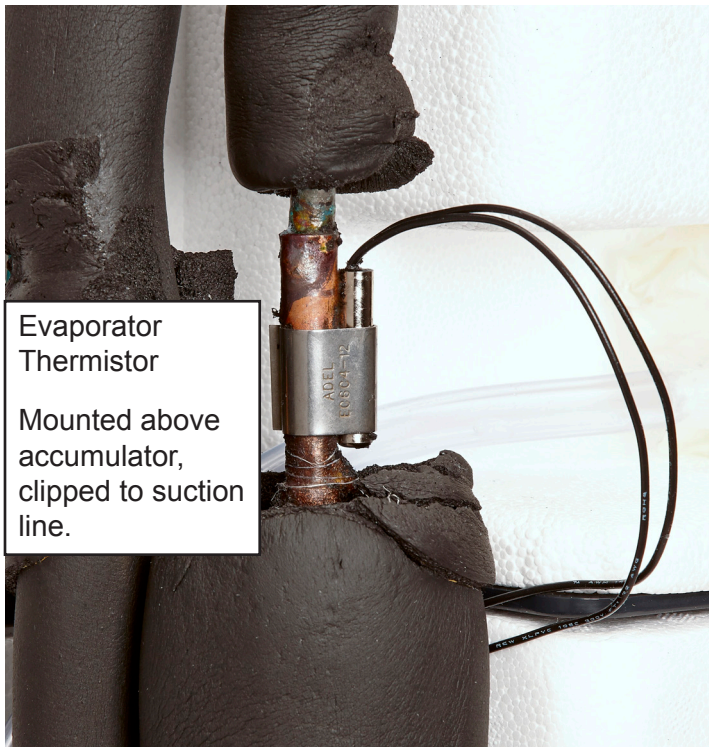
Inlet water solenoid valve: .275 GPM flow, line voltage coil

Transformer: Output 12 volt AC

Controller: Microprocessor operated relays for fan and pump. Internal electronic timer. Bridge thickness and harvest time adjustable on controller. Indicator lights for bridge thickness and harvest time. No maximum or minimum time limits or error codes. Lights for timer, freeze mode and anti-slush mode.

Thermistor failure indicated by all Bridge Thickness and Harvest Time green lights blinking. Unit continues to operate on a fixed timed freeze and harvest cycle.

Sensors: Thermistor for suction line temperature, Thermistor for reservoir water temperature.



Evaporator Thermistor

Mounted above accumulator, clipped to suction line.

Bin Thermostat: Opens on temperature fall, must be closed to power control system. Operates compressor directly.

Master switch. On, Off, or Wash. DPDT, not a service disconnect.

On: When contacts 2-1 are closed power is connected to the bin thermostat, allowing it to automatically switch the machine on and off.

At the same time contacts 5-4 are closed, making a circuit to the pump common and fan motor pressure control.

Off: all contacts open.

Wash: Contacts 2-3 provide a connection to contacts 5-6, connecting power to the pump common. Only the pump operates when the switch is in the Wash position.

Performance

CU0415

Compressor amp draw, 115 volt

- Freeze, 5 minutes in: 1.8 to 1.9
- Overall Freeze cycle amps, begin at 1.9 decline to 1.7.
- Harvest: 1.9 - 1.8

Compressor dome is normally warm.

Drain water per cycle at standard harvest setting: about 1.4 quarts, at shorter setting drain water reduced to 1 quart.*

CU0715

Compressor amp draw, 115 volt

- Freeze, 5 minutes in: 2.6
- Overall Freeze cycle amps, begin at 2.7 decline to 2.5
- Harvest: 2.9 - 3.2

Drain water per cycle at standard harvest setting: about 1 quart, at shorter setting drain water reduced slightly.*

CU0920

Compressor amp draw, 115 volt

- Freeze, 5 minutes in: 3.1
- Overall Freeze cycle amps, begin at 3.5 decline to 2.9
- Harvest: 3.3 - 3.7

Drain water per cycle at standard harvest setting: about 2 quarts, at shorter setting drain water reduced to 1.7 quarts.*

* Drain water is directly affected by harvest time, these numbers will vary with air and water temperature changes.

Thermistor Values

Deg. F	Ohms	Deg. F	Ohms	Deg. F	Ohms	Deg. F	Ohms	Deg. F	Ohms
0	85325	52	18873	104	5325	156	1819	208	724
1	82661	S3	18381	105	5208	157	1785	209	713
2	80090	54	17903	106	5093	158	1752	210	701
3	77607	55	17439	107	4981	159	1719	211	690
4	75210	56	16988	108	4872	160	1687	212	679
5	72896	57	16551	109	4766	161	1655	213	668
6	70660	58	16126	110	4663	162	1624	214	657
7	68501	59	15714	111	4562	163	1594	215	646
8	66415	60	15313	112	4463	164	1565	216	636
9	64400	61	14924	113	4367	165	1536	217	626
10	62453	62	14546	114	4273	166	1508	218	616
11	60571	63	14179	115	4182	167	1480	219	606
12	58752	64	13823	116	4093	168	1453	220	597
13	56995	65	13476	117	4006	169	1427	221	587
14	55296	66	13139	118	3921	170	1401	222	578
15	53653	67	12812	119	3838	171	1375	223	569
16	52065	68	12494	120	3757	172	1350	224	560
17	50529	69	12185	121	3678	173	1326	225	551
18	49043	70	11884	122	3601	174	1302	226	543
19	47607	71	11592	123	3526	175	1279	227	534
20	46217	72	11308	124	3452	176	1256	228	526
21	44872	73	11031	125	3381	177	1234	229	518
22	43571	74	10763	126	3311	178	1212	230	510
23	42313	75	10502	127	3243	179	1190	231	502
24	41094	76	10247	128	3176	180	1169	232	495
25	39915	77	10000	129	3111	181	1149	233	487
26	38774	78	9760	130	3047	182	1129	234	480
27	37669	79	9526	131	2985	183	1109	235	472
28	36600	80	9299	132	2924	184	1090	236	465
29	35564	81	9077	133	2865	185	1071	237	458
30	34561	82	8862	134	2807	186	1052	238	451
31	33590	83	8652	135	2751	187	1034	239	444
32	32649	84	8448	136	2696	188	1016	240	438
33	31738	85	8250	137	2642	189	998	241	431
34	30855	86	8056	138	2589	190	981	242	425
35	30000	87	7868	139	2537	191	965	243	419
36	29171	88	7685	140	2487	192	948	244	412
37	28368	89	7507	141	2438	193	932	245	406
38	27589	90	7333	142	2390	194	916	246	400
39	26835	91	7164	143	2343	195	901	247	394
40	26104	92	6999	144	2297	196	885	246	389
41	25395	93	6839	145	2252	197	871	249	383
42	24707	94	6683	146	2208	198	856	250	377
43	24041	95	6530	147	2165	199	842		
44	23394	96	6382	148	2123	200	828		
45	22767	97	6238	149	2082	201	814		
46	22159	98	6097	150	2042	202	800		
47	21569	99	5960	151	2003	203	787		
48	20997	100	5826	152	1965	204	774		
49	20442	101	5696	153	1927	205	761		
50	19903	102	5569	154	1890	206	749		
51	19381	103	5446	155	1855	207	737		

Controller Use

When in a Freeze cycle or mode, a blue light will glow.

The upper line of LED lights are indictions of the adjustment for Bridge Thickness. More lights = more freeze time and a bigger bridge.

The lower level line of LED lights are indicators of the adjustment for Harvest Time. More lights = more harvest time and more water rinse.

WARNING
Electrical Shock Hazard
Disconnect Electrical Power Before Servicing. May have more than one disconnect switch.
AVERTISSEMENT
Risque de Choc Electrique
Couper toutes les connexions. D'Alimentation Avant Le Dépannage.
ON / OFF / WASH
Ice Bridge Thickness Adjustment
Ajuste da espessura da ponte de gelo
Harvest Time Adjustment
Ajuste do tempo de colheita
Freeze Mode
Modo de congelamento
Timer On
Temporizador ligado
Unit in ice making mode, freeze mode indicator light is on.

At the end of the freeze cycle a yellow Timer light will switch on, indicating that there are 7 minutes left until Harvest.

During the end of Harvest the Timer light may also switch on.

WARNING
Electrical Shock Hazard
Disconnect Electrical Power Before Servicing. May have more than one disconnect switch.
AVERTISSEMENT
Risque de Choc Electrique
Couper toutes les connexions. D'Alimentation Avant Le Dépannage.
ON / OFF / WASH
Ice Bridge Thickness Adjustment
Ajuste da espessura da ponte de gelo
Harvest Time Adjustment
Ajuste do tempo de colheita
Freeze Mode
Modo de congelamento
Timer On
Temporizador ligado
Unit in ice making mode, timer indicator light is on.

Anti-Slush

Slush in the reservoir restricts pump flow, causes excessively long freeze cycles and is something this machine is designed to prevent.

It does that by shutting off the water spray to the evaporator at a critical time.

The critical time is when the water temperature is near the freezing point. The controller measures the water temperature using a thermistor probe in the pump discharge hose. At the correct temperature it cuts power to the water pump for 30 seconds. This allows the water left on the evaporator surface to securely freeze to the evaporator surface. When the pump restarts the freeze cycle will continue until harvest.

The indication that the unit is in a anti-slush mode is a light on the back of the controller.

Controller Self Test

Control Board Self-Test Routine. Begin with unit unplugged and no ice touching the bin control.

1. Remove top and back panels to access thermistor on suction line (above accumulator).
2. Remove the thermistor probe from the suction line.
3. Shut water supply off.
4. Remove front panel to access control.
5. Place evaporator thermistor probe in ice water, ice water temperature should be 0 C or 32 F.
6. Plug unit in, master switch in the ON position. 5 minutes or more after the freeze cycle starts check reservoir water temperature. When it and the evaporator thermistor's ice water are at 32 F, hold BOTH upper left - button and lower right + button in for at least 5 seconds, then release the buttons.
7. The green level LEDs will turn off and the yellow Timer LED will turn on for two seconds once you have entered the test mode.
8. Press upper left - button and the evaporator thermistor temperature test will begin. The yellow Timer LED will turn on for 2 seconds if the evaporator thermistor temperature is 32 F +/- 2 degrees.
9. Press upper left - again and the sump thermistor temperature test will begin. The yellow Timer LED will turn on for 2 seconds if the sump thermistor temperature is 32 F +/- 2 degrees. Note: Pressing - repeatedly will toggle between testing the two thermistor temperatures.
10. Press upper right + button and the Freeze relay will close and the blue Freeze LED will turn on for 5 seconds. Compressor, fan motor and pump will start. If not, the controller has failed.
11. Press upper right + again and the Pump relay will switch, the pump will stop and red LED (on back side of the board) will turn on for 5 seconds. Note: Pressing + repeatedly will toggle between testing the two relays.
12. Press and hold lower left - button and it will turn on each of the green LEDs, one at a time. Hold lower left – button in until all of the green LEDs are tested.
13. Press lower right + button to test the EEPROM read and write. The yellow Timer LED will turn on for 2 seconds if the EEPROM read and write operations were successful.

Power down the board to exit the test mode.

Test Results:

Step	Pass	Fail	Action if Failed
8	Yellow Timer LED switches ON	No timer light	Replace thermistor set
9	Yellow Timer LED switches ON	No timer light	Replace thermistor set
10	Compressor, fan motor and pump start	Either compressor or pump do not start	Check voltage to compressor or pump, If no voltage to one or both, replace controller.
11	Water pump stops	Pump does not stop	Replace controller
12	All green LEDs light up	Some do not illuminate	Replace controller
13	Yellow Timer LED switches ON	No timer light	Replace controller

If the controller passes all tests, there is nothing wrong with it and the issue is in something else.

1. Reattach evaporator thermistor to the suction line at the same place it was mounted and re-insulate it.
2. Reconnect water supply, restart unit and return all panels to their original positions.

Service Diagnosis

Problem	Possible Cause	Probable Correction
No ice	No water to ice machine	Check water filters, check water pressure. Pressure lower than 10 psi flowing may not fill reservoir enough.
No ice, nothing operating	No power to ice machine	Check power, restore if needed.
	Open contacts in bin thermostat	Check cabinet temperature, thermostat will be open if cabinet is too cold. Advise user to operate unit in proper conditions.
		Check bin thermostat contacts, if open at bin temperature above 45 degrees F., replace thermostat
	Master switch in OFF position	Move switch to ON
	Transformer failure	Check transformer output voltage, must be 12 volts at J1 - J2 of controller. If correct line voltage is supplied but output is too low, replace transformer.
	Controller failure, some lights visible	Check controller, use self test on prior page.
	Controller failure, 12 volts to it, no lights visible	Replace controller
No ice, compressor and fan on, pump not spraying water	No or low water in reservoir	Check water filters, check water pressure. Pressure lower than 10 psi flowing may not fill reservoir enough.
		Check inlet water solenoid valve for proper operation
		Check drain plug for leaks, correct as needed.
	Pump hose disconnected	Check hose at spray platform and pump
	Pump motor not working	Check voltage to pump. If none and blue freeze mode light is ON, wait 30 seconds. If still none, replace controller.
	Pump motor overheated	Check cabinet temperature, if too hot relocate unit. If not, replace pump.
		Voltage too high.
		Pump jammed, check inlet for debris, remove and retry.
		Pump failed, replace pump
No ice, pump spraying, fan motor and compressor off	Master switch in Wash position	Move switch to ON position
No ice, pump spraying, compressor on, fan motor not turning	Fan motor open, no power or stuck	Check blade for free rotation - correct by clearing debris jamming blade or replace motor if blade is not jammed

Service Diagnosis

Problem	Possible Cause	Probable Correction
No ice, fan motor not turning	No power to it	Check controller Freeze NO terminal to COM for proper voltage. If blue freeze light is on and no voltage, replace controller
		Check fan pressure control, if air temperature is over 70 degrees F, the pressure control should be closed when in freeze mode.
	Open windings	Check motor for continuity, replace if open
	Inlet water valve on all the time	Low voltage to machine, do not operate with wrong voltage
No ice, everything operating, poor spray to evaporator	Spray platform leaking	Check seams of spray platform, be sure it is sealed together.
No ice, everything operating, good spray to evaporator	Too much water	Check inlet water valve for leaking thru and overfilling reservoir, replace valve if leaking
No ice, everything operating, water in reservoir is hotter than supply water	Hot gas valve not shutting off	Check body of hot gas valve, if hot, replace valve.
No ice, everything operating	Not enough refrigeration	Check suction line temperature. When blue freeze mode light is on, suction line should begin to get cold. If not, confirm compressor is operating.
No ice in bin, evaporator mold forms ice properly	No heat for harvest, ice does not release	Hot gas valve does not open. Check water valve, if it adds water during harvest and the hot gas valve does not open, replace the hot gas valve. If both are not opening, replace the controller.
	Very cold water supply	Increase harvest time.
	Damaged evaporator	Check plating and replace if needed
No ice, compressor is off	Compressor relay not working	Check current relay for proper operation, replace if not working
	Compressor overload open, will not reset	Check / replace overload
	Compressor windings open	Check compressor windings, replace compressor if motor is open
	Compressor overheated	Check refrigeration system for proper charge
Makes ice but ice is cloudy or not completely formed	Spray jets restricted by mineral scale	Clean ice machine water system
	Lack of rinse water due to hot room temperature	Harvest time affects how much water is used to rinse the reservoir, if harvest time is short and mineral scale builds up fast adjust controller for more harvest time to add more rinse water.

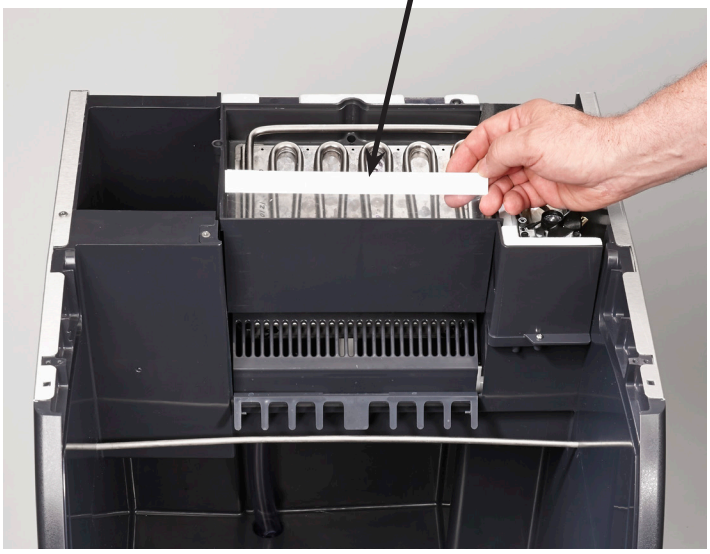
Service Diagnosis

Problem	Possible Cause	Probable Correction
Makes ice but makes blocks or shells	Ice bridge wrong size	Adjust to proper size
	Evaporator thermistor out of calibration, adjustment erratic	Check thermistor resistance to chart, replace if incorrect
	Poor thermal contact of evaporator thermistor to suction line	Check clip holding probe, must have metal-to-metal contact and covered with insulation
	Thermistor failure, unit operating on timed cycles	Check controller for all green lights blinking, if all blinking change thermistor set.
Makes ice but does not hold bridge setting, gradually increases over time	Evaporator temperature taking longer to get to cut in point	Refrigerant leak, check refrigeration system.
Makes ice but does not fill the bin	Bin thermostat opens and shuts machine off before bin is full	Unit in cold room, check conditions.
		Thermostat out of calibration, replace
		Unit at high altitude, adjust compensation screw
Unit makes ice but it is wet	Normal	Fresh ice will be wet
	Water dripping / spraying on it	Check curtain, may be torn or not in position
		Check that cube deflector is correctly positioned
Makes ice but is slow, cannot keep up	Air cooled condenser is dirty	Clean condenser fins
	Too much water	Slight leak from inlet water solenoid valve, check/replace valve
	Air flow to cabinet restricted	Confirm nothing blocking front louvers; unit cannot operate in a closet
	Room air hot	Hot air slows ice making and increases bin meltage
	Restricted drain	Water in bottom of bin melts ice, correct drain so all water drains including the water from harvest cycle
	Ice on top of evaporator	Drain slots plugged, clean water system
	Slush in reservoir	Do controller self check
Makes ice but is loud	Some noise is normal, the fan, pump and compressor all produce sound	Check for fan blade touching debris or shroud.
		Check that all panel fasteners are on tight.
		Identify loud part and replace it.
Door binds opening or closing	Roller or pin is broken	Check / replace door roller
Bin overfills	Bin thermostat does not open	Replace thermostat

Removal and Replacement

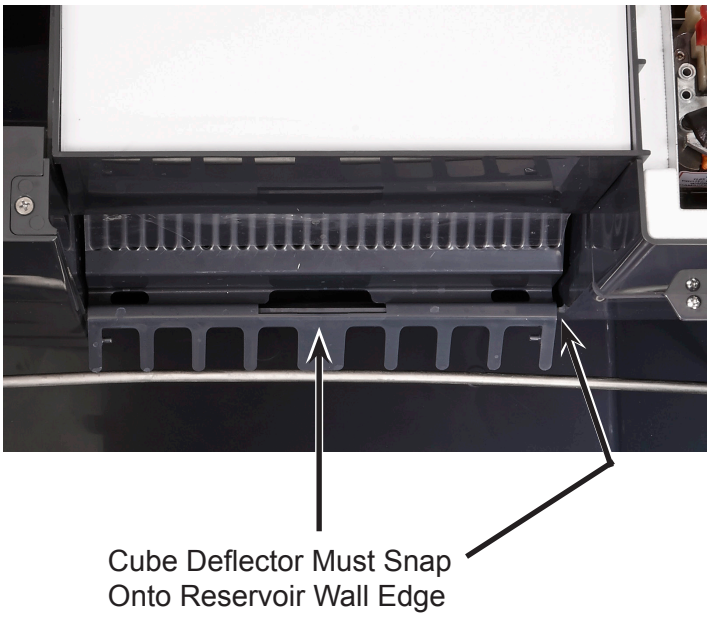
Curtain

1. Remove front panel and switch unit Off.
2. Remove top panel.
3. Remove evaporator cover.
4. Locate white curtain top at front of evaporator, pull up on it and remove from the unit.
5. Slide new curtain down in same place as original, into the slot between the plastic evaporator frame and the front of the reservoir. Push curtain down into the slot as far as it will go.
6. Check that curtain hangs freely and reassemble the parts removed.



Cube Deflector

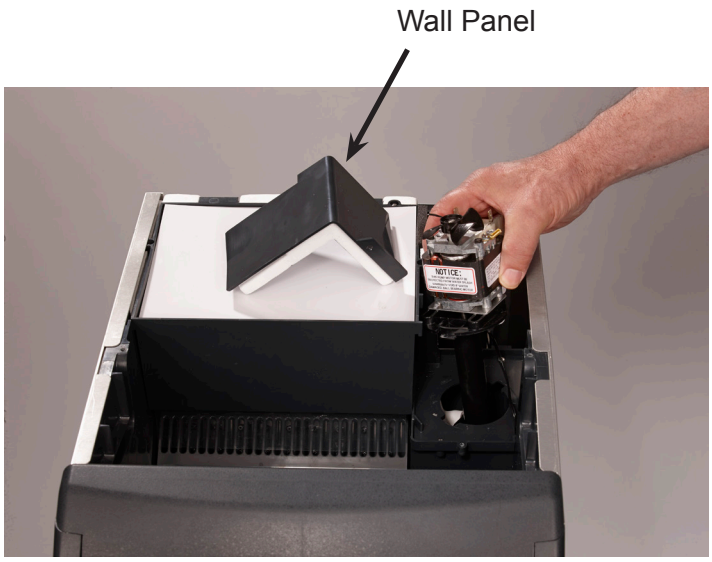
1. Remove front panel.
2. Shut unit off.
3. Open door, lift original cube deflector up, twist slightly and pull forward, out of the reservoir.
4. Install new deflector in reservoir, be sure deflector is snapped down at the front, it fits tightly on the reservoir edge.
5. Switch unit on and observe spray pattern, be sure deflector is not interfering with water spray.



Removal and Replacement

Pump

1. Disconnect electrical power.
2. Remove top panel.
3. Remove wall panel covering pump.
4. Disconnect wires from pump motor.
5. Remove cube deflector and pull hose off water pump outlet.
6. Rotate pump slightly CW and lift pump up and out of the ice machine.
7. Install new pump in reverse order of the removal steps.



Spray Platform

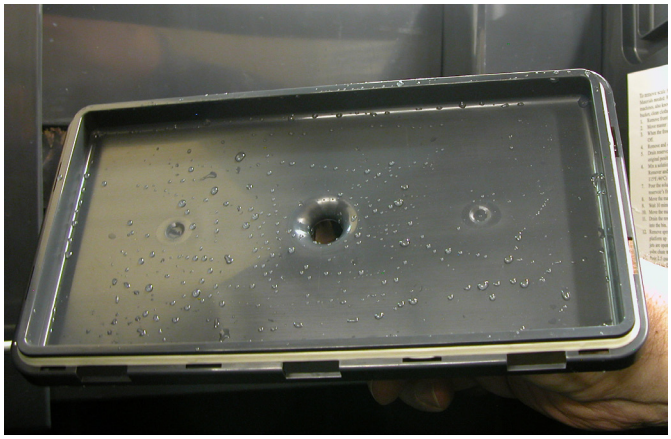
1. Remove front panel.
2. Shut unit off.
3. Open door, remove cube deflector by lifting it up, twisting slightly and pulling out.
4. Pull spray platform forward unit it releases from its snap, and remove pump hose from platform.
5. Remove platform from the unit. Replace or service and then reinstall it.
6. Reconnect pump hose.
7. Slide platform back into reservoir.

Note: Bottom of platform has a raised area that fits only on the left side. Be sure platform is placed all the way back in the reservoir and is snapped in place.

8. Reinstall cube deflector, be sure it is snapped onto the reservoir wall.
9. Switch unit on, check spray pattern.

Spray Platform Service

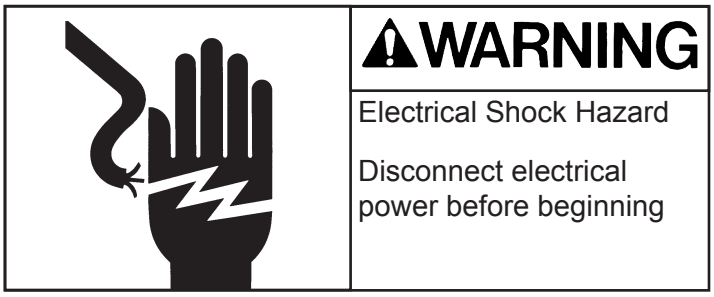
The two halves may be separated by removing the clips and pulling it apart. Be sure gasket is intact and installed correctly.



Removal and Replacement

Bin Thermostat

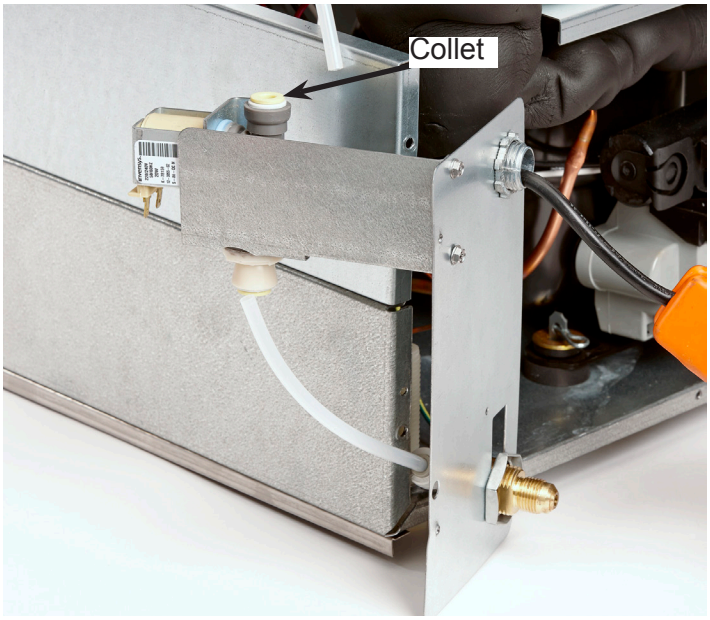
1. Disconnect electrical power.



2. Remove front panel.
3. Remove top panel.
4. Remove left side panel.
5. Remove tape covering cap tube and pull cap tube out of the sensing tube.
6. Remove back cover of control box.
7. Remove bin thermostat from control box and disconnect wires from it.
8. Remove sheet metal air baffle from in front of compressor.
9. Pull cap tube and bin thermostat from unit.
10. Route new bin thermostat's cap tube thru notch in left side of unit and up to the hole in the left side of the bin.
11. Insert cap tube into sensing tube.
12. Connect wires to bin thermostat.
13. Mount bin thermostat to control box.
14. Reinstall air baffle and control box back.
15. Reinstall left side panel. Be sure master switch is in the ON position.
16. Reinstall all panels.
17. Reconnect electrical power.

Inlet Water Solenoid Valve

1. Disconnect Electrical Power
2. Pull unit out to get back access.
3. Remove front panel.
4. Remove top panel.
5. Remove right side panel.
6. Remove back panel.
7. Shut water off to unit.
8. Remove utility panel, lower left corner viewed from the back. Valve bracket is attached to panel.
9. Locate inlet water solenoid valve.



10. Push in collets to release inlet and outlet tubing connections.
11. Disconnect electrical wires from valve.
12. Remove two screws holding valve to bracket and pull valve from unit.
13. Reconnect inlet and outlet tubing by pushing them into the replacement valve until they bottom out.
14. Re-attach wires to valve.
15. Re-attach valve to bracket.
16. Switch water on and check for leaks. Correct as needed.
17. Reconnect electrical power and confirm no leak while water valve is on.
18. Return all parts to their original positions.

Controller

The controller ships set for CU0715 and must be adjusted for other models. Please review these instructions prior to installation.

1. Disconnect electrical power.
2. Remove front panel.
3. Remove control box back cover
4. Disconnect all wires from controller, squeeze standoffs together to release from bracket and remove controller from the ice machine.
5. Touch the metal base of the ice machine before touching the new controller to discharge static electricity.
6. Mount the new controller onto the sheet metal bracket of the control box.
7. Connect all wires per the wiring diagram.
8. Reconnect electrical power and adjust the controller per this table (bin thermostat must be warm):

Model	Ice Bridge Lights On Steady	Ice Bridge Lights Blinking	Harvest Lights On Steady	Harvest Lights Blinking
CU0415	1	1	3	1
CU0715	2	0	3	1
CU0920	2	1	3	0

9. Return control box back and front panel to their normal positions.

Ice Bridge Thickness Adjustment

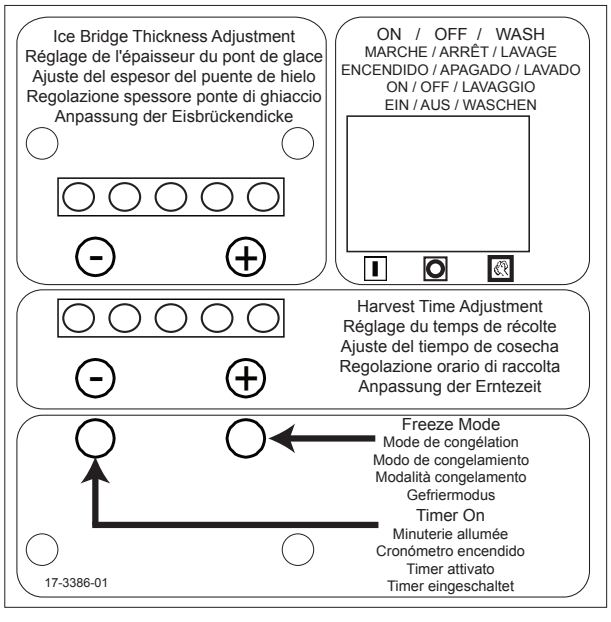
Adjust by pushing the + sign or – sign on the ice bridge adjustment section of the control panel until the correct number of lights are on steady or blinking. That is the factory setting. The ice bridge may be adjusted further if needed, but do NOT adjust too thin. Ice must release as a unit.

Harvest Cycle Time Adjustment

Adjust by pushing the + or - sign on the harvest time adjustment section of the control panel until the correct number of lights are on steady or blinking. That is the factory setting.

Proper harvest time is when the ice falls into the bin and there is about 10 seconds extra harvest time (pump and fan are off) before the freeze cycle restarts.

If the harvest time is too short to release the ice, or if more water must be purged in high ambient conditions, increase the time by pushing the + sign on the harvest time adjustment section of the control panel. Operate the machine for another cycle to confirm that the adjustment was correct. Note that too much harvest time will slightly decrease making ice capacity.

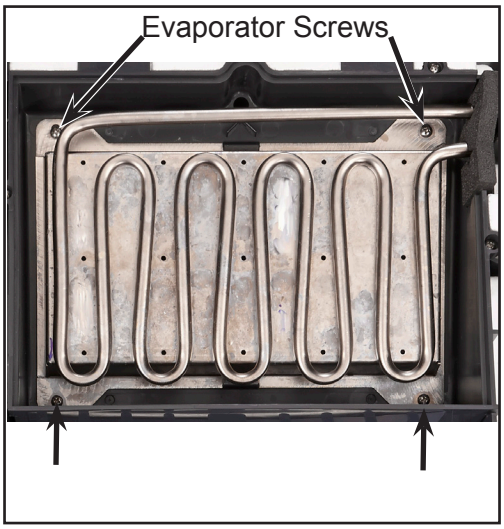


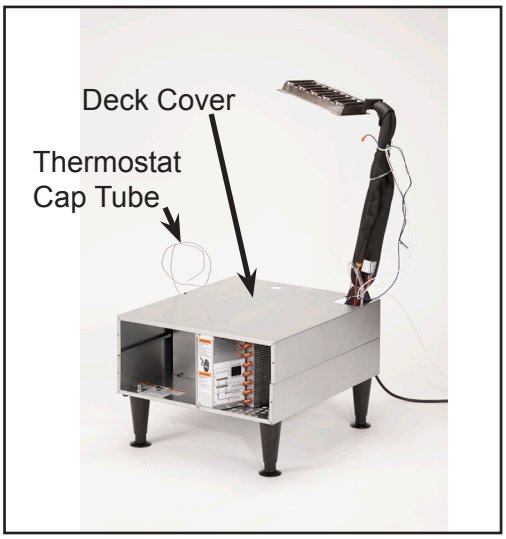
Cabinet Removal for Service

1. Remove front panel.
2. Remove top panel.
3. Remove door.
4. Drain water from reservoir.
5. Disconnect water and drain and electrical power.
6. Remove back and side panels.
7. Pull bin thermostat cap tube from tube in bin.
8. Remove evaporator cover.
9. Remove screws holding evaporator to its frame, lift evaporator up out of the way.

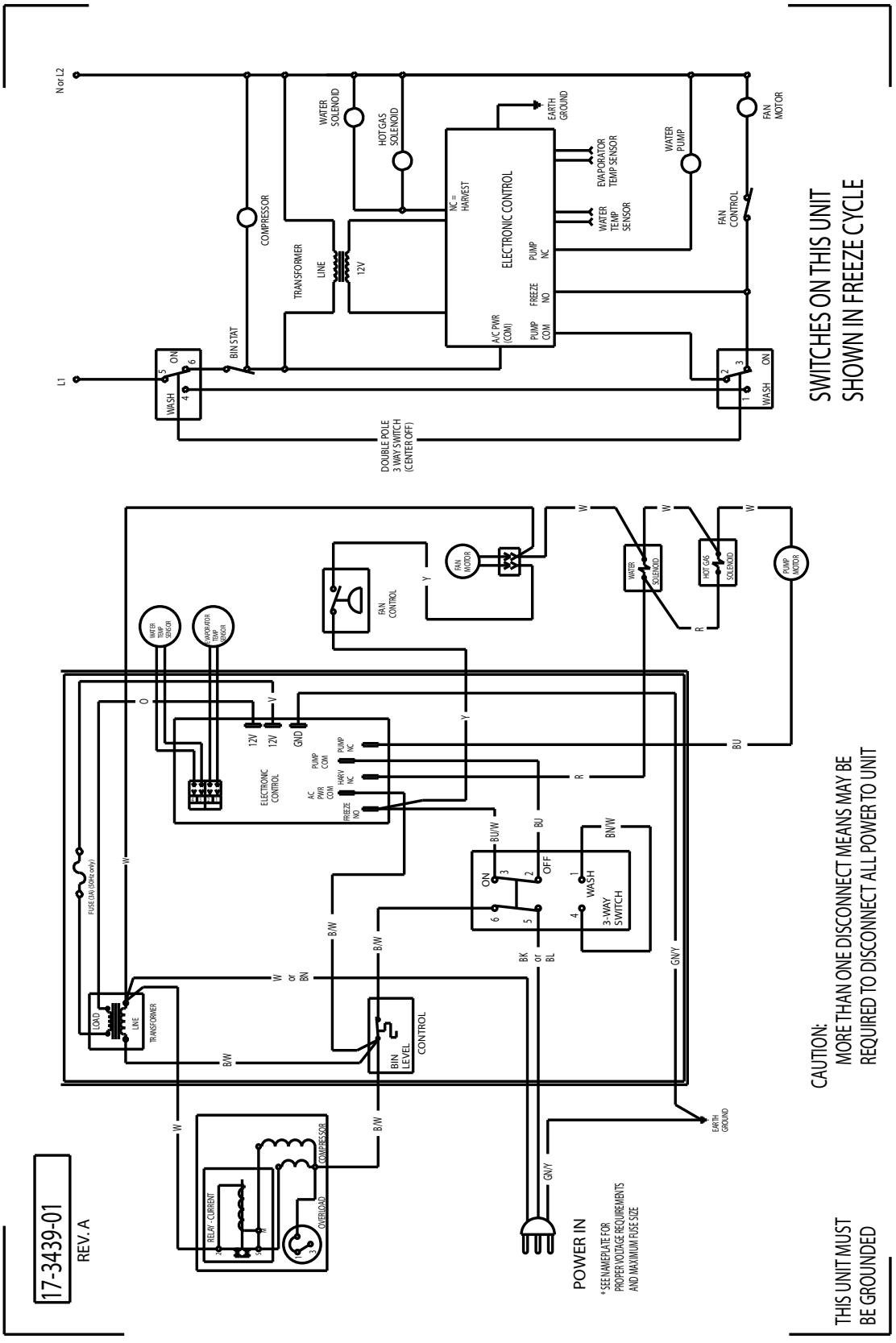
Note: Support evaporator as needed to prevent damage.

10. Disconnect electrical wires from water pump.
11. Remove thermistor from pump hose and reservoir.
12. Disconnect bin drain.
13. Disconnect water supply hose from evaporator platen.
14. Lift bin with reservoir off of deck.
15. Remove deck cover.





115/60/1 Wiring Diagram



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